CLAIMS

1.   A computer aided design system comprising:

a point sequence information extraction device which

5   extracts a plurality of point sequences on a curved surface;

a dividing device which generates a curved surface from

said point sequences using another computer aided design

system, and divides said curved surface into a predetermined

number of meshes;

10   a first fundamental form computing device for computing

coefficients of the first fundamental form defined by a

tangent vector which forms a tangent plane of said mesh;

a second fundamental form computing device for computing

coefficients of the second fundamental form defined by said

15   tangent vector and a normal vector of said mesh; and

a memory device which stores said point sequence

information, said coefficients of the first fundamental form

and said coefficients of the second fundamental form.

20   2.   A computer aided design system according to claim 1

further comprising:

a principal curvature computing device which computes a

principal curvature of said mesh based on said coefficients of

the first fundamental form and coefficients of the second

25   fundamental form;

a line of curvature computing device which computes a

line of curvature showing a principal direction of said mesh

based on said principal curvature;

a feature point/feature line analyzing device which extracts a point or a line which become a reference point or a reference line of transformation defined by changing patterns

5   of one or more feature quantities among five feature quantities showing features of said curved surface comprising a Gaussian curvature and a mean curvature computed based on said principal curvature, said principal direction, said line of curvature, and said coefficients of the first fundamental

10   form and coefficients of the second fundamental form; and

a girth length computing device which computes a girth length based on a curvature computed from said coefficients of the first fundamental form and coefficients of the second fundamental form.

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3.   A computer aided design system according to claim 2 further comprising:

a reproducing device which transforms said line of curvature for said girth length in said line of curvature

20   direction, with said feature point or feature line as a transformation reference, and reproduces said mesh or said curved surface.

4.   A computer aided design system according to claim 3

25   further comprising:

a converting device which extracts a plurality of point sequences on a curved surface from said reproduced mesh or

curved surface, and converts said point sequences according to a graphical representation algorithm in another computer aided design system.

5   5.   A computer aided design program for executing on a computer:

a point sequence information extraction process for extracting a plurality of point sequences on a curved surface;

a dividing process for generating a curved surface from
10   said point sequences using another computer aided design system, and dividing said curved surface into a predetermined number of meshes;

a first fundamental form computing process for computing coefficients of the first fundamental form defined by a
15   tangent vector which forms a tangent plane of said mesh;

a second fundamental form computing process for computing coefficients of the second fundamental form defined by said tangent vector and a normal vector of said mesh; and

a storage process for storing said point sequence
20   information, said coefficients of the first fundamental form and said coefficients of the second fundamental form.

6.   A computer aided design program according to claim 5 for further executing on a computer:

25   a principal curvature computing process for computing a principal curvature of said mesh based on said coefficients of the first fundamental form and coefficients of the second

fundamental form;

a line of curvature computing process for computing a line of curvature showing a principal direction of said mesh based on said principal curvature;

5   a feature point/feature line analyzing process for extracting a point or a line which become a reference point or a reference line of transformation defined by changing patterns of one or more feature quantities among five feature quantities showing features of said curved surface comprising
10   a Gaussian curvature and a mean curvature computed based on said principal curvature, said principal direction, said line of curvature, and said coefficients of the first fundamental form and coefficients of the second fundamental form; and

a girth length computing process for computing a girth
15   length based on a curvature computed from said coefficients of the first fundamental form and coefficients of the second fundamental form.

7.   A computer aided design program according to claim 6 for
20   further executing on a computer,

a reproducing process for transforming said line of curvature for said girth length in said line of curvature direction, with said feature point or feature line as a transformation reference, and reproducing said mesh or said
25   curved surface.

8.   A computer aided design program according to claim 7 for

further executing on a computer:

a converting process for extracting a plurality of point sequences on a curved surface from said reproduced mesh or curved surface, and converting said point sequences according to a graphical representation algorithm in another computer aided design system.

9. A computer graphics system comprising:

a point sequence information extraction device which extracts a plurality of point sequences on a curved surface;

a dividing device which generates a curved surface from said point sequences using another computer graphics system, and divides said curved surface into a predetermined number of meshes;

a first fundamental form computing device for computing coefficients of the first fundamental form defined by a tangent vector which forms a tangent plane of said mesh;

a second fundamental form computing device for computing coefficients of the second fundamental form defined by said tangent vector and a normal vector of said mesh; and

a memory device which stores said point sequence information, said coefficients of the first fundamental form and said coefficients of the second fundamental form.

10. A computer graphics program for executing on a computer:

a point sequence information extraction process for extracting a plurality of point sequences on a curved surface;

a dividing process for generating a curved surface from
said point sequences using another computer graphics system,
and dividing said curved surface into a predetermined number
of meshes;

5   a first fundamental form computing process for computing
coefficients of the first fundamental form defined by a
tangent vector which forms a tangent plane of said mesh;

a second fundamental form computing process for computing
coefficients of the second fundamental form defined by said

10   tangent vector and a normal vector of said mesh; and

a storage process for storing said point sequence
information, said coefficients of the first fundamental form
and said coefficients of the second fundamental form.